

Management Plan

Inelastic X-ray Scattering CAT

September 2002
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(03/26/2003)

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1 Introduction

The inelastic x-ray scattering collaborative access team (IXS-CAT) has been formed to create and run a beamline dedicated to the study of excitations in systems using inelastic x-ray scattering. This sets it apart from other CATs organized by region or designed to use a variety of techniques to study a particular set of problems. By their very nature, inelastic x-ray scattering experiments require highly complex setups, and this requirement makes time-sharing with other experiments extremely inefficient. The CAT will have two main instruments: a high-resolution instrument for studying meV excitations, and a medium-resolution instrument for studying excitations with energies on the order of a few hundred meV.

The IXS-CAT members come both from the existing inelastic x-ray scattering community and from the broader scientific community that would like to have access to such an instrument but lack the expertise or resources to operate one. They share the common belief that inelastic x-ray scattering can address some of the important problems in their fields. The strength of IXS-CAT lies in this extremely broad scientific program ranging from condensed-matter physics, to polymer science to biology, together with the resources that the CAT members bring to the consortium.

The member institutions of the CAT are listed below (individual members are listed in Appendix C):

Albert Einstein College of Medicine
Argonne National Laboratory
Brookhaven National Laboratory
Carnegie Institute of Washington
Lucent Technologies
Massachusetts Institute of Technology
Northeastern University
Oak Ridge National Laboratory
Princeton University
State University of New York, Stony Brook
Stanford University
University of Akron
University of California, San Diego
University of Illinois at Chicago
University of Illinois at Urbana-Champaign
University of Tennessee
University Pennsylvania
Western Michigan University

The management structure for the CAT is based on the dispersed membership and is given in section 2. The construction plan is given in overall form in section 3, with a detailed work breakdown structure (WBS) provided as appendix A. While this plan may change somewhat over time, we expect it to be fairly accurate. The implementation of

this plan in terms of quality assurance/control, procurement, cost control, and funding are described in the next four sections (4-7).

Safety is of key concern in the construction and running of the CAT and the overall plan is described in section 8. A more detailed safety plan will be developed based on the principles described there.

Due to the extended nature of the CAT member institutions, the dissemination of information between the CAT members is of key importance and is described in section 9.

Finally, we have detailed our operation plan, including our independent investigator program, in the final sections of the plan (10-11).

2 IXS-CAT Organization

The IXS-CAT organizational chart is shown in Figure 1 below. The basic structure will be used for both the construction and the operations phases although there are some differences (described below) due to the different concerns during the different phases. The current list of personnel for the various positions is also shown in figure 1.

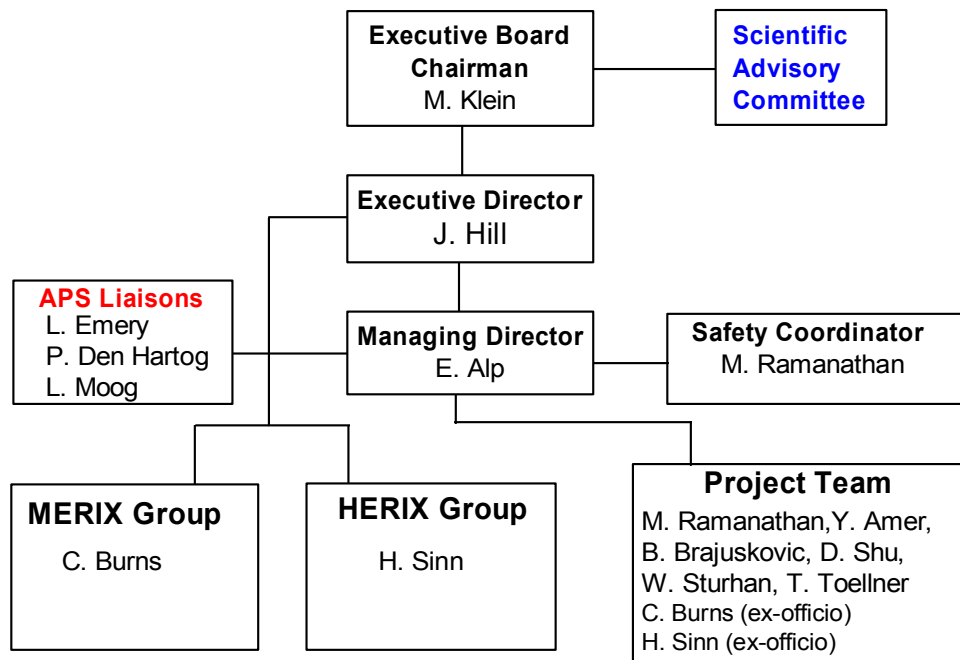


Figure 1. Organization Chart

The IXS-CAT is managed by an Executive Board (EB), which is elected by the members of the CAT. It consists of nine regular members: seven from the institutions providing substantial support to the CAT, and two members elected from the CAT membership. The Executive and Managing Directors, if not already members of the board, will be ex-officio members. The institutions having a member on the board are given below (the initial member from that institution is given in parenthesis).

Advanced Photon Source, Argonne National Laboratory (Efim Gluskin)
Bell Laboratories, Lucent Technologies (Eric Isaacs)
Brookhaven National Laboratories (C.-C. Kao)
State University of New York at Stonybrook (Peter Stephens)
University of Illinois at Urbana-Champaign (Miles Klein)
University of Pennsylvania (Takeshi Egami)
Western Michigan University (Clement Burns)

The two initial at large members are:
University of California, San Diego (Sunil Sinha)
Advanced Photon Source, Argonne National Laboratory (Harald Sinn)

Changes in the membership of the EB are possible after the end of a full term. Removal of an institution from the EB requires a 2/3 vote of approval from the EB members and then a majority vote from the CAT membership. Institutions that later bring substantial resources to the CAT can also be added to the board, with the same voting requirements as for removal of a member. Additions or removals of institutional members of the Board shall be brought to the attention of the Scientific Advisory Committee. Where appropriate, beamline staff will sit in on board meetings as nonvoting members.

Elected EB members will serve for a four-year term. During the planning and construction phases, the initial make-up of the board will persist. If there are resignations from the members-at-large, new members shall be elected by the CAT membership. Elections will be carried out electronically and nominations will be accepted from all CAT members. Nominations for institutional representatives on the Board require the approval of the institution.

Conflicts of interest can arise for members of the EB. In such an event, the members with a conflict of interest will be expected to recuse themselves from the discussion and the vote on that issue.

In the event that a scientific member of the EB changes institutions, the roles of the new and old institutions are expected to be negotiated between them and must be approved by the IXS-CAT EB.

The EB will elect a chair, who will serve a four-year term and is responsible for arranging meetings of the board, distributing agendas, relevant information, minutes, etc. The present chair is Miles Klein.

The board has a number of responsibilities, which include

- Establishing and developing the scientific mission of IXS-CAT
- Appointing and defining the roles of the CAT Executive Director and Managing Director
- Adding/removing members and institutions from IXS-CAT
- Overseeing and assessing the scientific and technical efforts, as well as the administration, of IXS-CAT
- Ensuring that productive use is made of allocated beam time
- Coordinating and overseeing funding issues
- Approving large fund expenditures (defined below)
- Approving overall design of the beamline/end station and its technical components, including major changes or alterations
- Overseeing the CAT safety program to ensure that an effective program is in place
- Assuring compliance with APS User Policies and Procedures
- Overseeing and monitoring reporting activities between the CAT and the CAT membership, the APS, the funding agencies, and the scientific community at large
- Developing and approving beamline allocation formulas and approving changes to these formulas.

The Executive Board is expected to meet least twice a year. Time-sensitive issues that need to be handled between meetings may be taken care of by phone conferences and email votes as needed. Summaries of all business that takes place via conference calls and e-mail will be written up and submitted as minutes at a regular meeting.

The IXS-CAT Director Team

The CAT Executive Director (ED) and Managing Director (MD) are appointed by the EB, generally for a period of three years. They will be authorized by the Board to carry out many of the Board's responsibilities. The present Executive Director is John Hill of Brookhaven National Laboratory. The present Managing Director is E. Ercan Alp of Argonne National Laboratory. Whereas they are expected to work together on most matters, specific duties will be assigned to each. The Executive Director will have the authority for fund raising, management of the budget, representing the CAT before external groups, and overall responsibility for the CAT to the Board. The Managing Director will have authority for beam line construction and eventual operation. He will represent the CAT before internal APS bodies. The MD will be authorized to insure that all IXS-CAT activities are conducted safely, in conformance with APS safety procedures. The ED and MD will make regular progress reports to the EB.

The ED and MD will be authorized by the EB to undertake the following:

Executive Director

- See that the beamline carries out the scientific vision of the EB

- Ensure that the beam time is used productively
- Implement operation modes and oversee the scheduling of beam time allotment for CAT members and users consistent with IXS-CAT and APS policies
- Oversee financial aspects of the CAT, including development of adequate funding
- Present an annual budget to the EB
- Oversee the budget, working with the PIs of the DOE and NSF construction grants, coordinating the funding efforts between IXS-CAT and the different institutions involved, handling reporting requirements, and interacting closely with Grants, Contracts, and purchasing offices at the universities and the APS
- Represent IXS-CAT to external bodies, including funding agencies, review committees, and the Scientific Advisory Committee of the APS. In addition, may attend research directors meetings.

Managing Director

- Oversee the project team in matters of design, specification, procurement, fabrication, installation, and commissioning of the beamlines and experimental facilities
- Manage beamline personnel.
- Ensure that the beamlines are designed, built and operated so that they are not a hazard to people or the environment
- Assure that beamline schedule and cost objectives are achieved
- To represent IXS-CAT within the APS, including the research directors meetings, providing the APS with required documents, following policies related to users, and carrying out other required tasks.
- Submit to the EB, through the Executive Director, construction and staffing plans consistent with the goals and funding of IXS-CAT
- Hire beamline personnel (with concurrence of the EB)

IXS-CAT Scientific Advisory Committee

An outside review committee will be formed to review the technical aspects of the beamline design and construction. After the beamline is commissioned, this committee (with appropriate changes in membership) will be asked for advice about the scientific program of IXS-CAT. The members will serve for four years, with staggered terms. The committee is expected to review the CAT once a year and will report to the Executive Board. The initial membership of the committee is: P. Allen (SUNY-SB), E. Burkel (U. Rostok), G. Blumberg (Lucent), M. Krisch (ESRF), D. Moncton (APS), A. Shukla (U. Paris), S. Nagler (ORNL) and M. van Veenendaal (N. Illinois U.).

Project Team

The project team will construct the beamline. It will be led by the Project Manager, presently M. Ramanathan of the APS. He will report to the Managing Director and be responsible for the procurement and construction of the experimental stations according to the plans approved by the EB. Other team members will report to the Project Manager

and will have specific responsibilities for the design and construction of the monochromators, experimental stations, and spectrometers. For proper coordination, the MERIX and HERIX group leaders (described below) will be *ex officio* members of the project team.

Safety Coordinator

The safety coordinator has the responsibility for insuring that all CAT construction activities are carried out in accordance with the IXS-CAT Safety Plan, with APS and ANL-E health and safety requirements, and any other applicable state and federal statutes. The safety coordinator, indeed, anybody, shall have the responsibility and authority to stop any action or experiment deemed unsafe without requiring any further authority. The current safety coordinator is M. Ramanathan.

MERIX and HERIX Groups and Principal Scientists

The high- and medium-resolution spectrometers, HERIX and MERIX, will be the respective responsibility of two principal scientists, presently H. Sinn and C. Burns. They will report to the Executive Director and will integrate the beamline layout to the needs of their instruments and, in so doing, will work closely with the project team. They are expected to originate purchase orders regarding the experimental station instrumentation, motion control, and data acquisition. They will also have primary responsibility for building up their respective end station groups, including the students, post-doctoral research associates, and junior scientists.

APS Liaisons

The IXS-CAT members have a number of innovative ideas. Their implementation will depend critically on the coordination of various APS divisions, specifically the Accelerator Systems, Accelerator Operations and Experimental Facilities Divisions. Representatives from these units will serve as contact personnel, will be on the internal mailing list of the IXS-CAT, and will be invited to relevant planning and information sessions.

3 Work Breakdown Structure

A work breakdown structure (WBS) for IXS-CAT has been established, broken down to the level at which cost, schedule and effort levels can be estimated. Modifications to the WBS may be necessary, depending especially on the funding situation. The WBS is shown in appendix A. Each aspect of the WBS will be the responsibility of a given individual. Effort costs have not been included, as these will be provided by the APS and some of the member institutions.

4 Quality Assurance and Control.

The IXS-CAT construction and operation will be conducted within the framework of an effective quality assurance and control (QA/QC) program. Special attention will be given to items that will affect beamline safety, reliability, and the quality of the research. The QA/QC efforts will be commensurate with the importance and complexity of the equipment and operations. External vendors/contractors will be selected that have established satisfactory QA/QC procedures.

The responsibility for quality will reside with the person in charge of the specific WBS task. The overall oversight of QA/QC matters falls under the authority of the Managing Director.

The following steps will be taken during the construction phase to guarantee quality assurance:

- A formal technical review of the beamline design will be conducted to assess the design with respect to the mission of IXS-CAT.
- Line responsibilities and authorities for QA/QC will be documented and disseminated.
- Whenever possible, industrial and national standards for design will be used. Previously used designs, software, etc. will be used when possible, and when these earlier designs have been tested and shown to be effective.
- Changes to design and specification documents will require written approval by the Managing Director, and substantial changes will be submitted to the Executive and Managing Directors and to the APS for review and approval. Changes will be signed and dated and put on file in a controlled storage file.
- All final design documentation, specifications, software, and procurement documents will be controlled documents, filed in a controlled storage area. All received equipment for a given part of the WBS will be inspected by the person in charge of that aspect of the WBS to assure it meets the specifications.
- The responsibility for the environmental and safety protection standards is given to the person in charge of QA/QC for a given item. They will consult with the CAT Safety Coordinator and with APS safety personnel as needed.

5 Procurement, Fabrication, and Cost Control

The IXS-CAT will use the procurement facilities of State University of New York at Stony Brook (SUNY-SB) and Western Michigan University (WMU) (each for the individual grants) to obtain equipment. The institutions will each designate a procurement expert to expedite matters for this project. Accounts will be established at the APS to provide access to the shops and storehouse. WMU will also provide VISA cards to personnel designated by the MD for low-value supply purchases. Monthly statements will be sent to the ED and other responsible members.

Advanced procurement plans will be developed for long-lead-time items. Whenever possible, and especially for major items, suppliers with a known successful track record in supplying equipment to the APS will be used. All conventional construction will be contracted through the APS. The CAT's activities involving on-site contractors will be in accordance with the APS User Policy and Procedure for Third party Contractors.

General limits on costs are given below. Changes to these rules will require a vote of the EB. These limits hold for all expenditures.

- Purchases under \$5000 (up to a pre-determined budgetary limit) are handled by WBS component designers and do not need director approval.
- Purchases from \$5000-\$100,000 require the approval by the Managing and Executive Directors.
- Purchases above \$100,000 require approval of the EB as submitted through the Executive and Managing Directors.

In all of these cases, the amount will be entered in a local funding database in order to allow accurate tracking of the total expenditures for the project. The QA/QC procedures as described earlier will be followed for all purchases, with the level of scrutiny increasing as the value of the purchase increases.

6 Funding

The funding for IXS-CAT will come from DOE, NSF, APS, and the member institutions. In particular, the NSF will provide \$900,000 over three years, member institutions have pledged another \$550,000, and the DOE will provide \$5,000,000 over the course of five years. Additional money or in-kind contributions are likely from several institutions that did not contribute to the first phase. The APS is committed to providing the insertion device chamber, insertion devices and the front end. In addition, the APS has committed personnel for project management.

The anticipated resources from the APS include:

FY2003

Manpower: 2 Engineers, 1.5 Scientists, 0.5 draftsmen

Hardware: None.

FY2004

Manpower: 2 Engineers, 2.5 scientists, 0.5 draftsmen, 1 post-doc, 0.5 technicians

Hardware: 20 kW front end, undulator A, order placed for s.c. undulator

FY2005

Manpower: 2.0 Engineers, 3 scientists, 2 post-docs, 0.25 draftsmen, 1 technician

Hardware: 2nd undulator A, 7.5 m straight section, LOM construction completed.

FY2006 (and beyond)

Manpower: 3 scientists, 2 post-docs, 1 technician, and beamline operating costs.

Hardware: 3rd undulator A (tentative), 10 m straight section

Details of how this breaks down are specified in a separate memo to Murray Gibson from the Directors of IXS-CAT dated December 13th, 2002. As noted in FY2005, it is also anticipated that the APS will provide an LOM for the CAT.

It is understood that many of these items involve technical issues, which in some cases have not yet been addressed. We note in this regard that changes to this plan will be made within the process outlined below.

The final control of the beamline funding is under the direction of the CAT Executive Director. The funding from the NSF grant is designated for the high resolution inelastic x-ray scattering instrument (HERIX), and these funds will flow through SUNY-SB. Funding for the medium resolution spectrometer (MERIX) and many of the common components is by the DOE through WMU. The Executive Director is responsible for coordinating the funding from these two sources and others.

7 Cost, Schedule, Performance and Change Control

The general construction plan is shown in the WBS as described in appendix A. The cost and schedules for construction are based on this structure and are shown in the same appendix. The Executive Director is ultimately responsible for monitoring and reporting the adherence of the construction to the plan provided. Updates will be made in the projected budget figures as the project moves forward and more detailed information in the forms of bids and actual expenditures are available.

Substantial changes or alterations that will significantly affect the project progress or cost and possibly the mission of the CAT will be brought to the notice of the EB for approval.

Official cost accounting will be carried out by the institutions that are officially responsible for the budgets. However, common cost accounting systems that keeps track of the items and the different budgets will be implemented to allow for more timely information.

IXS-CAT will implement a change control process as described below to handle design, and construction plan changes.

Changes in Plans:

The layout and configuration of beamline components was described, initially in the Conceptual Design Report (CDR). This will be followed by the Preliminary Design Report (PDR) and finally the Final Design Report (FDR). Each subsequent plan

supersedes the previous one, and it will be submitted to the EB for approval before submission to the APS.

Changes in APS Commitments:

These refer to any scope or design change that alters APS commitments significantly in terms of budget, resource allocation, and scheduling. They include specifically the following:

- Extension of straight section
- Undulator choice and delivery schedule
- Vacuum chamber gap
- Front end high heat load, and optical apertures
- Front end window.
- FOE components: White beam slits, integral shutter

Changes in such items must be approved by the Director of the Experimental Facilities Division (XFD) in consultation with the XFD Engineering group leader.

Changes in IXS-CAT Plans:

These include changes in the scientific scope, membership, cost, and schedules.

- Any change in the scientific scope including energy range and spectrometer capabilities must be submitted by the IXS-CAT directors to the IXS-CAT Executive Board for its approval.
- Applications for new membership should be made to the IXS-CAT Executive Director, and must then be approved by EB.
- Any change in costs that will have a potential impact over \$100 K shall be approved by the EB.
- Any change in scheduling that may delay the project more than 6 months shall be approved by the EB.

8 Safety Requirements

Health and safety considerations are vitally important during the design, construction, and operation of IXS-CAT. The IXS-CAT intends to fully comply with all health and safety regulations and requirements of Argonne National Laboratory (ANL) and the APS.

The IXS-CAT will be constructed and operated by the APS staff. As such, in accordance with the line management responsibilities at ANL, the order of the responsibility for safety is as follows:

Beamline staff, beamline safety coordinator (BSC), XFD high resolution x-ray scattering (HRX) Group Leader, and XFD Division Director. The line responsibility will

be modified in accordance with future changes in the APS organizational structure. During the construction and commissioning phase, the beamline safety coordinator (BSC) is the same as the project manager (M. Ramanathan).

The responsibilities of the beamline safety coordinator (BSC) include the development of a construction safety plan, which meets APS approval prior to the beginning of construction. The plan will ensure that personnel, outside users, and contractors meet required health and safety requirements. In addition, the BSC will make sure that the safety plan is being properly followed. All personnel involved in the construction will have the authority to stop any work that is not being carried out according to the agreed upon safety procedures.

Before the operational phase, the BSC will be responsible for developing an IXS-CAT specific Safety Plan and Safety Manual. This plan will be approved by APS prior to operations. Based on this plan, a training program will be required of all staff and outside users prior to utilization of the beamline. All staff and users will comply with APS and ANL safety requirements. All use of potentially hazardous chemical or biological or radiological materials for experiments will require prior approval by the BSC, as well as a written plan describing their use during the experiment and their disposal after the experiment is over.

The BSC (and other staff as relevant) will work closely with the APS personnel during the construction phase to insure compliance with safety regulations. IXS-CAT will use APS designated safety interlock systems, which will be installed by APS staff. A number of CAT members are presently working at the APS and are very familiar with safety procedures there.

9 Reporting and Information

The IXS-CAT is a technique-based CAT rather than one based around a relatively small number of institutions. It therefore has a wide variety of members from a large number of different institutions. Communication between the different members is therefore even more important than at many other CATs. Adequate communication between the different CAT members, the Executive Board, the APS, and the funding agencies is essential to the construction and successful operation of the CAT. In order to insure adequate communication, the following steps will be taken.

- The EB for the CAT will hold two regular meetings yearly to discuss construction/operational issues. Due to the wide geographical spread in the membership, these meetings will need to be supplemented by phone and videoconferencing.
- Results of the meetings will typically be sent by email to CAT members. A web site that contains a record of the meeting results will also be implemented. Other documentation and information (Safety plan, Reports of Beamline Design

Reviews and Inspections, and a CAT newsletter.) will also be posted to the WEB site.

- Workshops will be held for CAT members to highlight science opportunities and progress in the field of inelastic x-ray scattering.
- Project management reports, including construction overviews, yearly financial report, and equipment inventory will be provided to the EB.
- The Scientific Advisory board of the APS will also hold regular meetings to evaluate the construction and scientific program of the CAT.
- Regular reports on the beamline construction progress will be submitted to the APS by the Managing Director, describing the progress as compared to the milestones established. All publications, patents, etc., will be submitted to the APS in a timely manner.
- A Preliminary Design Report will be produced within a few months of the official start of the CAT that will include the overall beamline design plan and the construction schedule.
- Any significant changes in the design/scope of the project, or in the funding, or in the CAT membership will be reported to the EB and the APS.
- General users will be informed about the availability of time as well as the technical capabilities of the beamline. A report to the APS on the general users program will be submitted annually to the APS.

10 Operation Plan

It is anticipated that the out year operations of the CAT will be funded by the Advanced Photon Source and in this scenario the beam time will be allocated in accordance with APS policies. A transition plan into this mode from CAT operations will be presented to the APS SAC at the appropriate time with a view to making this transition as fast as possible consistent with the best possible science being performed at the beamline.

11 General User Program

A plan for the general user program will be developed later in consultation with the APS.

Appendix A Work Breakdown Structure for IXS CAT

WBS	Activity Name	Start Date	Finish Date	Total Budget K\$	DOE 02 K\$	NSF 02 K\$	DOE 03 K\$	NSF 03 K\$	MF 03 K\$	DOE 04 K\$	NSF 04 K\$	MF 04 K\$	DOE 05 K\$	DOE 06 k\$	2002				2003				2004				2005				2006							
															A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
IXS-7	Beamline Optics	9/9/02	8/31/07	1,568.0			624.0	50.0	144.0	170.0		140.0	140.0	300.0																								
IXS-7.1	Filter	5/5/03	11/19/04	5.0			5.0																															
IXS-7.1.1	Design	5/5/03	8/8/03	0.0																																		
IXS-7.1.2	Procurement	8/11/03	10/3/03	5.0			5.0																															
IXS-7.1.3	Installation	10/18/04	11/19/04	0.0																																		
IXS-7.2	White Beam Slits	5/5/03	11/19/04	44.0			44.0																															
IXS-7.2.1	Design	5/5/03	8/8/03	0.0																																		
IXS-7.2.2	Procurement	8/11/03	10/3/03	44.0			44.0																															
IXS-7.2.3	Installation	10/18/04	11/19/04	0.0																																		
IXS-7.3	Focusing Lens	3/3/03	11/19/04	44.0					44.0																													
IXS-7.3.1	Design	3/3/03	7/11/03	0.0																																		
IXS-7.3.2	Procurement	7/14/03	9/5/03	44.0					44.0																													
IXS-7.3.3	Installation	10/25/04	11/19/04	0.0																																		
IXS-7.4	Primary Monochromator	9/9/02	12/3/04	400.0			400.0																															
IXS-7.4.1	Design	9/9/02	12/13/02	0.0																																		
IXS-7.4.2	Procurement	3/10/03	5/9/03	400.0			400.0																															
IXS-7.4.3	Installation	11/1/04	12/3/04	0.0																																		
IXS-7.5	Integral Shutter	3/3/03	8/27/04	50.0				50.0																														
IXS-7.5.1	Design	3/3/03	4/25/03	0.0																																		
IXS-7.5.2	Procurement	5/12/03	7/11/03	50.0				50.0																														
IXS-7.5.3	Installation	7/12/04	8/27/04	0.0																																		
IXS-7.6	Monochromatic Shutter	5/12/03	8/27/04	50.0						50.0																												
IXS-7.6.1	Design	5/12/03	10/10/03	0.0																																		
IXS-7.6.2	Procurement	2/9/04	4/9/04	50.0						50.0																												
IXS-7.6.3	Installation	7/12/04	8/27/04	0.0																																		
IXS-7.7	Monochromatic Mirrors	4/7/03	8/31/07	575.0			175.0		30.0	70.0				300.0																								
IXS-7.7.1	MERIX Mirror	4/7/03	6/3/05	275.0			175.0		30.0	70.0																												
IXS-7.7.1.1	Design	4/7/03	10/3/03	0.0																																		
IXS-7.7.1.2	Procurement	10/6/03	3/5/04	275.0			175.0		30.0	70.0																												
IXS-7.7.1.3	Installation	3/7/05	6/3/05	0.0																																		
IXS-7.7.2	HERIX Mirror	5/2/05	8/31/07	300.0										300.0																								
IXS-7.7.2.1	Design	5/2/05	8/5/05	0.0																																		
IXS-7.7.2.2	Procurement	2/6/06	4/7/06	300.0										300.0																								
IXS-7.7.2.3	Installation	4/9/07	8/31/07	0.0																																		
IXS-7.8	Support Tables	8/11/03	9/24/04	50.0								50.0																										
IXS-7.8.1	Design	8/11/03	10/10/03	0.0																																		
IXS-7.8.2	Procurement	2/2/04	3/26/04	50.0								50.0																										
IXS-7.8.3	Installation	6/28/04	9/24/04	0.0																																		
IXS-7.9	Optical Tables	10/3/03	11/18/05	180.0								90.0	90.0																									
IXS-7.9.1	Design	10/3/03	3/5/04	0.0																																		
IXS-7.9.2	Procurement	4/12/04	5/6/05	180.0								90.0	90.0																									
IXS-7.9.3	Installation	2/7/05	11/18/05	0.0																																		
				6,444.8	1000.0	335.5	1003.0	415.5	144.0	1001.0	453.6	320.0	993.0	779.2	ASONDDJFMAMJJASONDDJFMAMJJASONDDJFMAMJJASONDDJFMAMJJASONDD																							

[illegible]

Appendix B Letters of Funding Commitment



Department of Energy
Germantown, MD 20874-1290

December 17, 2001

Professor Clement Burns
Western Michigan University
Department of Physics
1903 W. Michigan Avenue
Kalamazoo, MI 49008-5252

Dear Professor Burns:

I am pleased to inform you that your new application entitled "Development of a Sector Dedicated to Inelastic X-ray Scattering", has received technical approval from the Office of Basic Energy Sciences and our Chicago Operations Office has been requested to execute an appropriate grant agreement. You should hear from them soon. You are advised that the Department of Energy assumes no obligation until a grant has been properly negotiated.

Two administrative points are noted: First your grant will extend for a 60-month period and will be funded in five 12-month increments. In order for the next increment to be funded, it is necessary that a progress report of the research for the previous increment and a summary of the research carried out in the subsequent increment be submitted to the Department of Energy six months prior to the new increment starting date. The first progress report and summary of research should be sent no later than August 2, 2002. The summary of future research should contain rationale for the research identification of personnel associated with the program and a complete listing of Federal support, current or pending. Two copies of the progress report and summary should be sent directly to Melanie Becker. Other copies should be sent to the above-named operations office - see your grant agreement for details. Second, in order for us to clearly identify the research we sponsor, it is necessary that you maintain your research under our support distinct from that for other Federal agencies.

Best wishes for continuing progress in your research.

Sincerely,

A handwritten signature in cursive script, appearing to read "Helen M. Kerch".

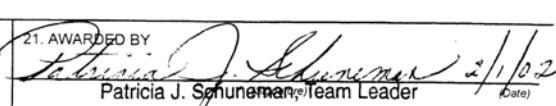
Helen M. Kerch
Division of Materials Sciences
and Engineering
Office of Basic Energy Sciences



Printed with soy ink on recycled paper

U.S. DEPARTMENT OF ENERGY
OFFICE OF FINANCIAL ASSISTANCE AWARD
 (See Instructions on Reverse)

Under the authority of Public Law 95-91, U.S. Department of Energy Organization Act _____ and
 subject to legislation, regulations and policies applicable to (cite legislative program title): Basic Energy Sciences

1. PROJECT TITLE Development of a Sector Dedicated to Inelastic X-ray Scattering		2. INSTRUMENT TYPE <input checked="" type="checkbox"/> GRANT <input type="checkbox"/> COOPERATIVE AGREEMENT																			
3. RECIPIENT (Name, address, zip code, area code and telephone no.) Western Michigan University 1903 West Michigan Avenue Kalamazoo, MI 49008 616-387-8298		4. INSTRUMENT NO. DE-FG02-02ER45969																			
8. RECIPIENT PROJECT DIRECTOR (Name and telephone No.) Clement Burns [(616) 387-4921]		5. AMENDMENT NO. A000																			
9. RECIPIENT BUSINESS OFFICER (Name and telephone No.) Donald E. Thompson [616-387-8298]		6. BUDGET PERIOD FROM: 02/01/2002 THRU: 01/31/2003																			
11. DOE PROJECT OFFICER (Name, address, zip code, telephone No.) Helen M. Kerch U.S. Department of Energy (SC-64) SC-13 19901 Germantown Road (301) 903-2346 Germantown, MD 20874-1290		7. PROJECT PERIOD FROM: 02/01/2002 THRU: 01/31/2007																			
13. RECIPIENT TYPE <input type="checkbox"/> STATE GOVT <input type="checkbox"/> INDIAN TRIBAL GOVT <input type="checkbox"/> HOSPITAL <input type="checkbox"/> FOR PROFIT ORGANIZATION <input type="checkbox"/> INDIVIDUAL <input type="checkbox"/> LOCAL GOVT <input checked="" type="checkbox"/> INSTITUTION OF HIGHER EDUCATION <input type="checkbox"/> OTHER NONPROFIT ORGANIZATION <input type="checkbox"/> C <input type="checkbox"/> P <input type="checkbox"/> SP <input type="checkbox"/> OTHER (Specify)		12. ADMINISTERED FOR DOE BY (Name, address, zip code, telephone No.) Peter Waldman 630/252-2189 U.S. Department of Energy/ACQ Chicago Operations Office 9800 South Cass Avenue Argonne, IL 60439																			
14. ACCOUNTING AND APPROPRIATIONS DATA <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%;">a. Appropriation Symbol 89X0222.91</td> <td style="width:25%;">b. B & R Number KC020201</td> <td style="width:25%;">c. FT/AF/IOC WACH/410</td> <td style="width:25%;">d. CFA Number N/A</td> </tr> </table>		a. Appropriation Symbol 89X0222.91	b. B & R Number KC020201	c. FT/AF/IOC WACH/410	d. CFA Number N/A	15. EMPLOYER I.D. NUMBER 386007327															
a. Appropriation Symbol 89X0222.91	b. B & R Number KC020201	c. FT/AF/IOC WACH/410	d. CFA Number N/A																		
16. BUDGET AND FUNDING INFORMATION a. CURRENT BUDGET PERIOD INFORMATION <table style="width:100%;"> <tr> <td style="width:60%;">(1) DOE Funds Obligated This Action</td> <td style="width:40%; text-align: right;">\$1,000,000.00</td> </tr> <tr> <td>(2) DOE Funds Authorized for Carry Over</td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>(3) DOE Funds Previously Obligated in this Budget Period</td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>(4) DOE Share of Total Approved Budget</td> <td style="text-align: right;">\$1,000,000.00</td> </tr> <tr> <td>(5) Recipient Share of Total Approved Budget</td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>(6) Total Approved Budget</td> <td style="text-align: right;">\$1,000,000.00</td> </tr> </table>		(1) DOE Funds Obligated This Action	\$1,000,000.00	(2) DOE Funds Authorized for Carry Over	\$0.00	(3) DOE Funds Previously Obligated in this Budget Period	\$0.00	(4) DOE Share of Total Approved Budget	\$1,000,000.00	(5) Recipient Share of Total Approved Budget	\$0.00	(6) Total Approved Budget	\$1,000,000.00	b. CUMULATIVE DOE OBLIGATIONS <table style="width:100%;"> <tr> <td style="width:60%;">(1) This Budget Period [Total of lines a.(1) and a.(3)]</td> <td style="width:40%; text-align: right;">\$1,000,000.00</td> </tr> <tr> <td>(2) Prior Budget Periods</td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>(3) Project Period to Date [Total of lines b.(1) and b.(2)]</td> <td style="text-align: right;">\$1,000,000.00</td> </tr> </table>		(1) This Budget Period [Total of lines a.(1) and a.(3)]	\$1,000,000.00	(2) Prior Budget Periods	\$0.00	(3) Project Period to Date [Total of lines b.(1) and b.(2)]	\$1,000,000.00
(1) DOE Funds Obligated This Action	\$1,000,000.00																				
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(2) Prior Budget Periods	\$0.00																				
(3) Project Period to Date [Total of lines b.(1) and b.(2)]	\$1,000,000.00																				
17. TOTAL ESTIMATED COST OF PROJECT \$ N/A (This is the current estimated cost of the project. It is not a promise to award nor an authorization to expend funds in this amount.)																					
18. AWARD/AGREEMENT TERMS AND CONDITION This award/agreement consists of this form plus the following: a. Special terms and conditions. b. Applicable program regulations (specify) <u>10 CFR Part 605</u> (Date) <u>01/01/2000</u> c. DOE Financial Assistance Rules, 10 CFR Part 600, as amended. d. Application/proposal dated <u>11/12/2001</u> , <input checked="" type="checkbox"/> as submitted <input type="checkbox"/> with changes as negotiated																					
19. REMARKS See Page No. 2 of this Notice of Financial Assistance Award.																					
20. EVIDENCE OF RECIPIENT ACCEPTANCE _____ (Signature of Authorized Recipient Official) (Date) _____ (Name) _____ (Title)		21. AWARDED BY  Patricia J. Schuneman, Team Leader Operations Division Office of Acquisition and Assistance Contracting Officer																			

Mail for **Mohan Ramanathan**

Wed, 30 Oct 2002 10:19:39 -0500

Page
1

From: Helen.Kerch@science.doe.gov Wed Oct 30 09:19:50 2002
From: "Kerch, Helen" <Helen.Kerch@science.doe.gov>
To: "Clement Burns" <clement.burns@wmich.edu>
Cc: "mohan@aps.anl.gov" <mohan@aps.anl.gov>
Subject: IXSCAT funding verification
Date: Wed, 30 Oct 2002 10:19:39 -0500

Clem,

The purpose of this communication is to verify that BES has awarded a grant for the construction of the IXSCAT to Western Michigan University. The recommended funding profile is \$1M per year for FY02-FY06 for a total of \$5M.

Any further questions please don't hesitate to contact me.

Helen

IXSCAT funding verification

Stephens



"Kline, Andrea"
<akline@nsf.gov>

03/05/02 09:46 AM

To: "osp@notes.cc.sunysb.edu" <osp@notes.cc.sunysb.edu>
cc: "Grzechowiak, John K." <jgrzecho@nsf.gov>, "Savory-Heflin, Carol
A." <csavory@nsf.gov>, "Tessema, Guebre" <gtessema@nsf.gov>
Subject: Award Id: 0115852, PI: Stephens

Award Date:	March 5, 2002
Award No.	DMR-0115852
Proposal No.	DMR-0115852

Mr. Ivar Strand
Director of Sponsored Programs
The Research Foundation of SUNY, State
University of New York at Stony Brook
Stony Brook, NY 11794-3362

Dear Mr. Strand:

The National Science Foundation hereby awards a grant of \$300,000 to The Research Foundation of SUNY, State University of New York at Stony Brook for support of the project described in the proposal referenced above as modified by revised budget dated November 20, 2001.

This project, under the direction of Peter W. Stephens, Clement Burns, Ercan E. Alp, John P. Hill, Miles V. Klein, is entitled:

"Development of High Energy Resolution Inelastic X-ray Scattering Instrument for Materials Research and Education."

This award is effective March 15, 2002 and expires February 28, 2003.

This is a continuing grant which has been approved on scientific / technical merit for approximately 3 years. Contingent on the availability of funds and the scientific progress of the project, NSF expects to continue support at approximately the following level:

FY 2003	\$300,000
FY 2004	\$300,000

This grant is awarded pursuant to the authority of the National Science Foundation Act of 1950 , as amended (42 U.S.C. 1861-75) and is subject to Federal Demonstration Partnership General Terms and Conditions (FDP-III, dated 07/01/00) and the NSF Agency-Specific Requirements (dated 07/01/00) and the following terms and conditions:

The grantee agrees to provide total cost sharing as specified in the referenced proposal, as amended, in the amount of \$505,000. For estimating purposes, the grantee has proposed to meet the cost sharing commitment in the following annual levels: Year 1 - \$166,000; Year 2 - \$167,000; and Year 3 - \$172,000. This cost sharing requirement is contingent upon continued support of the award at the levels indicated above. No Federal funds may be used to meet the grantee's cost sharing obligation for this project.

The attached budget indicates the amounts, by categories, on which NSF has based its support.

The cognizant NSF program official for this grant is Guebre X. Tessema (703) 292-4943. The cognizant NSF grants official contact is Tracy Gorman (703) 292-8217.

Sincerely,

Andrea R. Kline
Grants Officer

CFDA No. 47.049
osp@notes.cc.sunysb.edu

DMR-0115852

000

SUMMARY PROPOSAL BUDGET

Person MOS	Funds		
	granted		
	cal	acad	sumr By NSF
A. (0.00) Total Senior personnel	0.00	0.00	0.00 \$0

B. Other Personnel				
1. (0.00) Post Doctoral associates	0.00	0.00	0.00	\$0
2. (0.00) Other professionals	0.00	0.00	0.00	\$0
3. (0.00) Graduate students				\$0
4. (0.00) Secretarial-clerical				\$0
5. (0.00) Undergraduate students				\$0
6. (0.00) Other				\$0
Total salaries and wages (A+B)				\$0
C. Fringe benefits (if charged as direct cost)				\$0
Total salaries wages and fringes (A+B+C)				\$0
D. Total permanent equipment				\$295,000
E. Travel				
1. Domestic				\$0
2. Foreign				\$0
F. Total participant support costs				\$5,000
G. Other direct costs				
1. Materials and supplies				\$0
2. Publication costs/page charges				\$0
3. Consultant services				\$0
4. Computer (ADPE) services				\$0
5. Subcontracts				\$0
6. Other				\$0
Total other direct costs				\$0
H. Total direct costs (A through G)				\$300,000
I. Total indirect costs				\$0
J. Total direct and indirect costs (H+I)				\$300,000
K. Residual funds / Small business fee				
1. Residual funds (if for further support of				
current projects GPM 252 and 253)				\$0
2. Small business fee				\$0

L. Amount of this request (J) or (J-K1+K2)	\$300,000
M. Cost sharing	\$166,000



Office of the Vice President
for Research

13 November 2001

✓ Peter Stephens, Professor
Department of Physics and Astronomy
State University of New York at Stony Brook
Stony Brook, New York 11794-3800

Re: Research Support Request #01-0112-624GRI

Dear Dr. Stephens:

Thank you for your Research Support Request entitled, "Development of High Energy Resolution Inelastic X-Ray Scattering Instrument for Materials Research and Education." The Office of the Vice President for Research (OVPR) has reviewed your application and based upon the information provided and analysis by my office we pledge the following from the Graduate Research Initiative (GRI) program.

FY01/02	\$60,000
FY02/03	\$60,000
FY03/04	\$60,000
TOTAL	\$180,000

Commitment of the GRI funds is dependent upon continued funding of the GRI program by the State of New York and requires equal or greater matching support from the National Science Foundation. Any reduction in the NSF contribution will result in a parallel reduction in the GRI component. Please also note that purchases made with State-sponsored GRI funds must be matched by non-State sources, and may only be used to purchase the equipment described in your proposal. Acquisition of the equipment must follow State procedures and must take place within six months of the award. The equipment will also become property of the State.

Should this application be funded, please contact Peter Saal in my office at 2-9033 to learn what procedures to follow in order to access GRI funds.

Best wishes for success with your proposal.

Sincerely yours,

Gail S. Habicht
Gail S. Habicht, Ph.D.
Vice President for Research

GSH:ejm

cc: Denise Johnson
Peter M. Saal
Janos Kirz

STONY BROOK, NEW YORK 11794-3365 TEL: 631-632-7932 FAX: 631-632-9520

PROJECT AGREEMENT

This agreement, made and entered into this 15th day of March, 2002, by and between The Board of Trustees of Western Michigan University (hereinafter known as WMU) and The Research Foundation of the State University of New York (hereinafter known as the Second Party). WMU is a constitutional body corporate organized and existing under the constitution of the State of Michigan, with offices in the city of Kalamazoo, Michigan. Second Party is organized and existing under the laws of the State of New York, with offices in Stony Brook.

1. RECITALS. WMU has made a commitment of institutional cost-sharing on the National Science Foundation award for "Development of High Energy Resolution Inelastic X-ray Scattering Instrument for Materials Research and Education" [DMR-0115852] issued to Second Party. Second Party has engaged WMU as a participant in this project as described in Appendix A.
2. SCOPE OF SERVICES. WMU shall provide a matching contribution of \$200,000 in cash over the three-year period of the grant to be used for the project: \$75,000 will be provided for each of the first two years and \$50,000 for the final year. Of the \$200,000 to be provided by WMU as match for this proposal, \$25,000 will be available to support the travel and other expenses associated with the project by the project co-principal investigator at WMU (Dr. Clement Burns).
3. TIME OF PERFORMANCE. The first year of this agreement shall commence on March 15, 2002, and shall continue 11.5 months through February 28, 2003.
4. SCHEDULE OF CHARGES. WMU agrees to pay Second Party \$60,000 upon invoice from Second Party and to provide documentation to Second Party of \$15,000 in travel and other expenses by the project co-principal investigator at WMU (Dr. Clement Burns) as cost sharing within 30 days of the closing date of this agreement. Additional cash payments and document of additional cost sharing for the second and third years of the award will be arranged by amendment to this agreement.
5. FEDERAL FUNDS. If this project is being supported with federal funds, please list the federal agency [National Science Foundation - CFDA # 47.049] and the federal program title [Instrumentation for Materials Research Program].
6. LIABILITY. Each party to this agreement will be responsible for its own actions and must seek its own legal representation and bear its own costs, including judgments, in any litigation that may arise from its action during the performance of this agreement. It is specifically understood and agreed that neither party will indemnify the other party in such litigation.
7. TERMINATION OF AGREEMENT FOR CAUSE. If either Second Party or WMU shall violate any of the covenants, understandings or stipulations of this agreement, and the violation is not cured within 15 days, the aggrieved party shall thereupon have the right to terminate this agreement by giving written notice to the other party of such termination and specifying the cause(s) and the effective date thereof. Such notice must be delivered 15 days before the effective date. In the event that such cause for termination shall lie with Second Party, all facets of the project must be taken to a logical stopping point and WMU has the right to pursue any rights or remedies that WMU may have against Second Party by reason of such default. Should the cause of termination lie with WMU, any further obligations to be fulfilled by WMU under this agreement shall be subject to negotiation by all parties. Neither WMU nor Second Party shall be responsible for any liability for damages sustained by the other party by virtue of any breach of this agreement or through negligence on the part of the other party.
8. RECORDS. WMU shall maintain all books, documents, papers, accounting records or other evidence pertaining to costs incurred for a period of three years from the date of final payment under this agreement. Such materials shall be readily available during the agreement and retention period for inspection, audit and/or duplication at all reasonable times by authorized representatives of Second Party.
9. DISSEMINATION OF INFORMATION AND INTELLECTUAL PROPERTY RIGHTS. Publications pertaining to this agreement or the services, data, or project to which it relates will not be made without prior approval of both parties. Neither party shall unreasonably withhold its approval. *plw*
10. AMENDMENTS. This agreement constitutes the complete understanding of the parties hereto and any amendment to the agreement must be agreed to in writing and signed by both parties.

SIGNED ON BEHALF OF WMU

[Signature]

 LOWELL P. RINKER
 Assistant Treasurer and Assistant VP for Business
 (616) 387-2366

SIGNED ON BEHALF OF SECOND PARTY

[Signature]

 LYDIA CHABZA
 Contracts and Grants Administrator
 (631) 632-4849



Penn Engineering

Vijay Kumar
Deputy Dean

January 9, 2001

Dr. Guebre X. Tessema
Directorate of Mathematical and Physical Sciences
Division of Materials Research
National Science Foundation
4201 Wilson Boulevard, Suite 1065
Arlington, Virginia 22230

REF: Proposal entitled: "High Energy Resolution Inelastic X-ray Scattering Instrument at the Advanced Photon Source"

Dear Dr. Tessema:

I am writing to confirm that the University of Pennsylvania, School of Engineering and Applied Science will be delighted to support Professor Takeshi Egami's participation in the above proposal to the National Science Foundation. This letter is to confirm that the University of Pennsylvania shall provide \$50,000 in matching funds if the proposal is fully funded at the amount requested. It is our policy that if the proposal is funded at an amount lower than requested, the match might be reduced proportionately.

Sincerely,

Dr. R. Vijay Kumar
Deputy Dean
School of Engineering &
Applied Science

University of Pennsylvania • School of Engineering and Applied Science • 111 Towne Bldg. • 220 South 33rd Street
Philadelphia, PA 19104-6391 • Tel: 215.898.8241 • Fax: 215.573.5577 • E-mail: kumar@cis.upenn.edu



Office of the Dean

College of Polymer Science and Polymer Engineering
Akron, OH 44325-3809
(330) 972-7500 Office
(330) 972-6290 Fax

January 18, 2001

**Dr. Guebera X.
Tessema
Directorate of Mathematical and Physical Sciences
Division of Materials Research
National Science Foundation
4201 Wilson Boulevard, Suite 1065
Arlington, VA 22230**

**Re: Proposal entitled "Development of High-Energy Resolution Inelastic X-Ray
Scattering Instrument for Materials Research and Education"**


Dear Dr. Tessema:

We are writing to confirm that The University of Akron fully supports Professor Alexei Sokolov's participation in the above proposal to the National Science Foundation. This letter is to confirm that The University of Akron shall provide \$50,000 (\$25,000 from the College of Polymer Science and Polymer Engineering and \$25,000 from Research Services and Sponsored Programs) in matching funds if the proposal is funded in the amount requested. If the proposal is funded at an amount lower than requested, the match might be reduced proportionately.

Sincerely,


**Frank N. Kelley
Dean**

Sincerely,


**Gerald M. Parker
Director, Research Services and
Sponsored Programs**



Northeastern
UNIVERSITY

Office of the Provost
112 Hayden Hall
Northeastern University
Boston, Massachusetts 02115-5000
Phone: 617.373.2170
Facsimile: 617.373.8589

29 November, 2000

National Science Foundation
4201 Wilson Boulevard
Arlington VA 22230

Attn: Instrumentation for Materials Research Program.
Project Title: High Energy Resolution Inelastic X-ray Scattering Instrument at the Advanced Photon Source
Principal Investigator: Peter Stephens, SUNY at Stony Brook
Co-PI's from Northeastern University: Arun Bansil, Paul Champion and Tim Sage

Dear Sir/Madam:

On behalf of Northeastern University, I am pleased to inform you that the University is prepared to provide \$50,000 in matching funds over a period of three (3) years (from fiscal year 2001-2002 through fiscal year 2004-2005) to support the work as stated in the attached proposal entitled, "High Energy Resolution Inelastic X-ray Scattering Instrument at the Advanced Photon Source", in case the award is made at the requested funding level. The expenditure of these funds will conform to all appropriate regulations and University policies.

I believe that the proposed project will advance your goals and is worthy of your financial support. The University looks forward to collaborating with the Foundation and the other collaborating universities on this and future projects.

Sincerely,

David Hall
Provost and Senior Vice President for Academic Affairs

cc: Vice Provost Hedlund
Director McNeil
A. Bansil
P. Champion
T. Sage

corresp/Match-ArBm.doc

Appendix C CAT Membership

Below we list the current membership of the CAT, by institution. Addition of new members is made upon application to the Executive Board through the Executive Director.

Albert Einstein College of Medicine

Denis Rousseau

Argonne National Laboratory

E. Alp, A. Macrander, H. Sinn, W. Sturhahn, T. Toellner

Brookhaven National Laboratory

D. Gibbs, J. Hill, C.-C. Kao, S. Shapiro

Carnegie Institute of Washington

D. Mao

Lucent Technologies

E. Isaacs, P. Platzman

Massachusetts Institute of Technology

H. Chen, Y. Lee

Northeastern University

A. Bansil, P. Champion, T. Sage

Oak Ridge National Laboratory

B. Larson, J. Tischler

Princeton University

Z. Hasan

State University of New York, Stony Brook

Peter Stephens

Stanford University

M. Greven, Z.X. Shen

University of Akron

A. Sokolov

University of California, San Diego

S. Sinha

University of Illinois at Chicago

J.C. Campuzano

University of Illinois at Urbana-Champaign

T.C. Chiang, M. Klein, I. Robinson, M. Salamon, R. Simmons

University of Tennessee

A. Eguiluz

University Pennsylvania

T. Egami

Western Michigan University

C. Burns